

Polymorphism in *Satyrium calanus* (Huebner) from Wyoming and Colorado (Lepidoptera: Lycaenidae: Theclinae)¹

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Abstract. Some populations of *Satyrium calanus* in Wyoming and Colorado are polymorphic. These various forms are discussed and illustrated.

Introduction

In a recent paper, the author discussed some of the forms of *Satyrium calanus* (Huebner) that occur from northern New Mexico to southern Wyoming (Ferris, 1981(82)). The manuscript for this paper was originally submitted for publication in early 1980. In the ensuing period, additional specimens have been obtained from southern Wyoming and further comments are in order. Two other publications, discussed below, have also treated the insect as it occurs in the Rocky Mountains.

Throughout most of the Rocky Mountain region, *S. calanus* is referable to the subspecies *godarti* (Field), a typical male of which is shown in Figs. 1-2. Phenotypic variation within what is considered normal *godarti* was discussed by Ferris (1981(82)) and by Fisher in Ferris & Brown (1981). The species as a whole uses oak as the larval host, although other plants are occasionally reported. The distribution of *S. calanus* in the Rocky Mountains is thus restricted to regions in which oak occurs, usually *Quercus gambelii* Nutt.

In 1904, James Fletcher described what he thought to be a new species, *Thecla heathii*, from southern Manitoba. Field (1938) first reduced this taxon to the status of an aberrational form, and subsequent authors have concurred with Field's action (Brown, Eff & Rotger, 1957; dos Passos, 1964). Miller & Brown (1981) omitted the taxon entirely. Based upon its collection locality, "heathii" is an aberrational form of *S. calanus falacer* (Godart). Fletcher described "heathii" based upon a single female specimen.

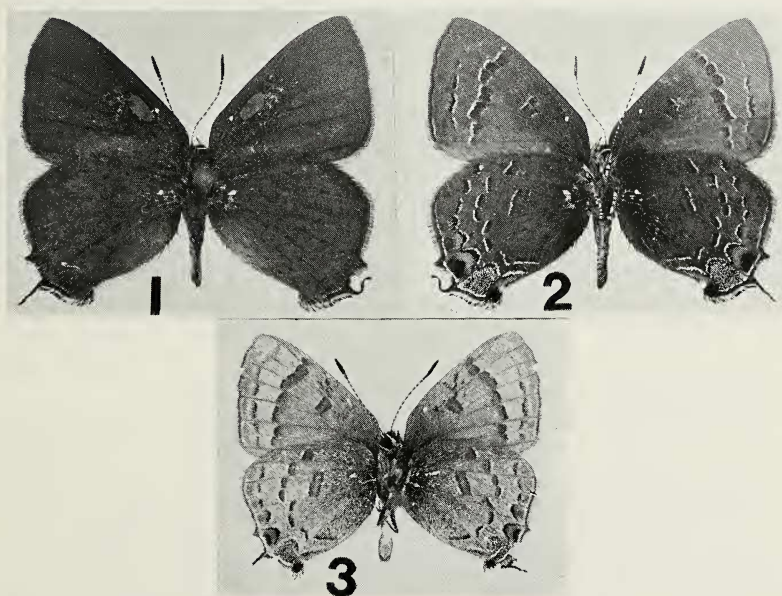
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As noted by Fisher (1976), the "heathii" aberration occurs rarely and he listed records from Manitoba, Michigan and Colorado. Muller (1976) figured a specimen from New Jersey. The first Colorado record, a single specimen, was reported by Stallings & Turner (1943) from Beulah, Pueblo Co., on 6 July 1942. A decade later, J. D. Eff was the first collector to find the "heathii" form at two localities in Routt Co., Colorado, during July and August, 1953 (Fig. 3). I collected the first Wyoming specimens, from Carbon Co., in early August, 1977.

As noted by both Ferris and Fisher in the 1981 publications cited above, there is considerable phenotypic variation in both the Routt and Carbon Co. populations. Specimens from these areas are generally quite pale ventrally, when compared to typical *calanus godarti*, and many manifest the wide white band characteristic of the "heathii" aberration. In many, but not all, of the males, the forewing scent pad tends to be paler in color than in normal *godarti*.

Notwithstanding this variability, Scott (1981) has raised the "heathii" form status of these populations to subspecific recognition as the trinomial *S. calanus albidus* Scott. The designated type locality is "NW Hayden,



Figs. 1-2. Typical male of *Satyrium calanus godarti* from Hardscrabble Creek, Custer Co., Colorado, 4 July 1968, leg. J. A. Scott. (1) Dorsal. (2) Ventral.

Fig. 3. Ventral surface of *S. calanus* male from Rabbit Ears Pass, Routt Co., Colorado, 22 July 1972, leg. M. S. Fisher.

Routt Co. Colo." The original description of *albidus* neither figures nor describes the male Holotype *per se*, nor does it adequately discuss the pattern variation that occurs within Colorado and Wyoming populations. In fact, Scott does not mention at all that *calanus* even occurs in Wyoming. The female Allotype is from Montrose Co., Colorado, and paratypes are from Routt, Garfield and Montrose Counties. Delta Co. is also mentioned, but without specific locality.

Study Site and Observations

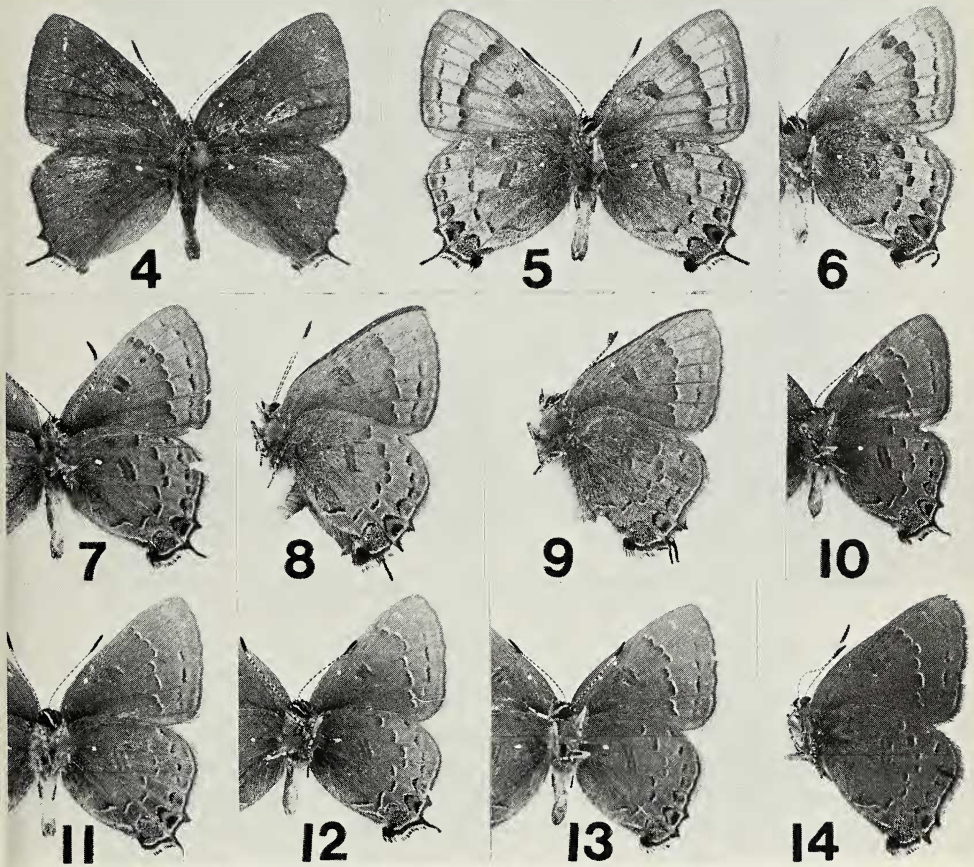
The remainder of this paper discusses the polymorphic nature of *S. calanus* from the vicinity of Battle Creek, ca. 7800' (2380 m), Sierra Madre range, Carbon Co., Wyoming, and includes some comments about populations on the Western Slope in Colorado. These butterflies are not particularly common in Carbon Co. The first specimens were collected by the author in 1977, and the totals to date are only 28 males and 9 females.

Of the sample taken, a wider range of variation is observed in the males than in the females, as indicated by Figs. 4-14 (males) and Figs. 15-20 (females). This difference between the sexes may simply reflect the smaller female sample size. Dorsally, fresh specimens of both sexes are gray-brown as opposed to the dark brown to almost black of *godarti*. Ventrally the ground color in both sexes ranges from very pale gray (nearly white in some males) to pale gray-brown, as opposed to medium-to-dark brown in normal *godarti*. The males range from the typical "heathii" phenotype (Figs. 5-6) to forms resembling other subspecies of *calanus* in maculation, but not coloration (Figs. 11-14). Table 1 summarizes the frequency of various color forms found in the Carbon Co., Wyoming, and Routt Co., Colorado, populations.

The variation in the ventral maculation of the females is not so pronounced as in the males. Two specimens are of the form shown in Figs. 16-17, these being closest to "heathii" collected to date. The more usual female forms are shown in Figs. 19-20. Interestingly enough, "heathii" was originally described from a female specimen.

Specimens of *calanus* from along the Western Slope in Colorado are generally paler than Front Range *godarti*, and their maculation in general is reduced, including the hindwing "Thecla" spot. One specimen in the M. S. Fisher collection from Gunnison Co. is very white ventrally.

The Wyoming population occurs in oak-aspen-conifer habitat. The majority of the specimens collected have been taken along the top of a ridge where *Q. gambelii* is the dominant tree. The butterflies are flushed from the scrub by the traditional "beating" method. A few specimens of both sexes have been taken in a valley several hundred feet below the ridge, where they were nectaring at various flowers, but they do not appear to visit flowers on a regular basis. Both the ridge and valley area are aligned in a north-south direction, with the valley to the west side of the ridge. The



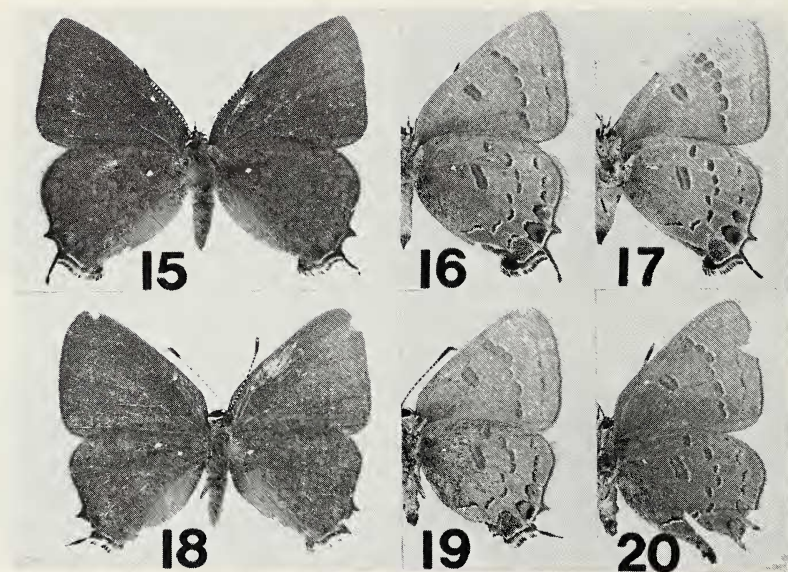
Figs. 4-14. Variation in males of *S. calanus* from vic. Battle Creek, west slope of Sierra Madre range, Carbon Co., Wyoming, ca. 7800' (2380 m), all 29 July 1981, collected by the author. (4) Dorsal. (5-14) Ventral surfaces of ten specimens.

butterflies follow the sun, frequenting the eastern side of the ridgetop in the morning, and the western edge and slope in the afternoon.

The Routt Co. colony near Rabbit Ears Pass occupies a similar ridgetop habitat. The geographic extent of this colony and the Carbon Co. colony are both quite small.

Discussion

S. calanus appears to occur in disjunct colonies along the Western Slope from southern Wyoming to southern Colorado. There is considerable clinal variation throughout this region.



Figs. 15-20. Variation in females of *S. calanus* from vic. Battle Creek, west slope of Sierra Madre range, Carbon Co., Wyoming, ca. 7800' (2380 m), collected by the author. (15) Dorsal, 29 July 1981. (16) Same, ventral. (17) Ventral, 29 July 1981. (18) Dorsal, 2 Aug. 1977. (19) Same, ventral. (20) Ventral, 2 Aug. 1977.

Since Scott did not figure the Holotype of *albidus*, nor did he provide a description of it, this taxon is enigmatic. It is questionable that the Wyoming and related Colorado populations discussed above merit subspecific recognition because of their variability, as I so stated (Ferris, 1981(82)). There is no difference in the male genitalia between the Wyoming population and typical *calanus godarti*. While Scott alluded to some variability of *albidus*, he did not exclude any variants from the type series (Art. 72(b), Code of the I.C.Z.N.). In view of the wide geographic range and disjunct populations represented by the type series of *albidus*, it is doubtful that this taxon satisfies the provisions of Articles 72 & 73 of the Code of the I.C.Z.N. Article 13 is also not met.

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TABLE 1. Frequency of Ventral Phenotype in *S. calanus* from Carbon Co., Wyoming, and Routt Co., Colorado

		Carbon Co. Wyoming (N = 28)	Routt Co. Colorado (N = 17)
Males			
Pale Gray-White (= "heathii")	Figs. 3, 5-6	0.29	0.53
Gray	Figs. 7-9	0.25	0.47
Gray-Brown	Figs. 10-13	0.43	—
Light Brown	Fig. 14	0.03	—
Females		(N = 9)	(N = 0)
Gray	Figs. 16-17	0.22	—
Gray-Brown	Figs. 19-20	0.78	—

Note: Only one specimen of the "heathii" phenotype was collected at Beulah, Pueblo Co., Colorado. The "heathii" form is characterized by the ventral postmedian space being very much lighter than the ground color. This is a recurrent gene in many Eumaeine hairstreaks.